

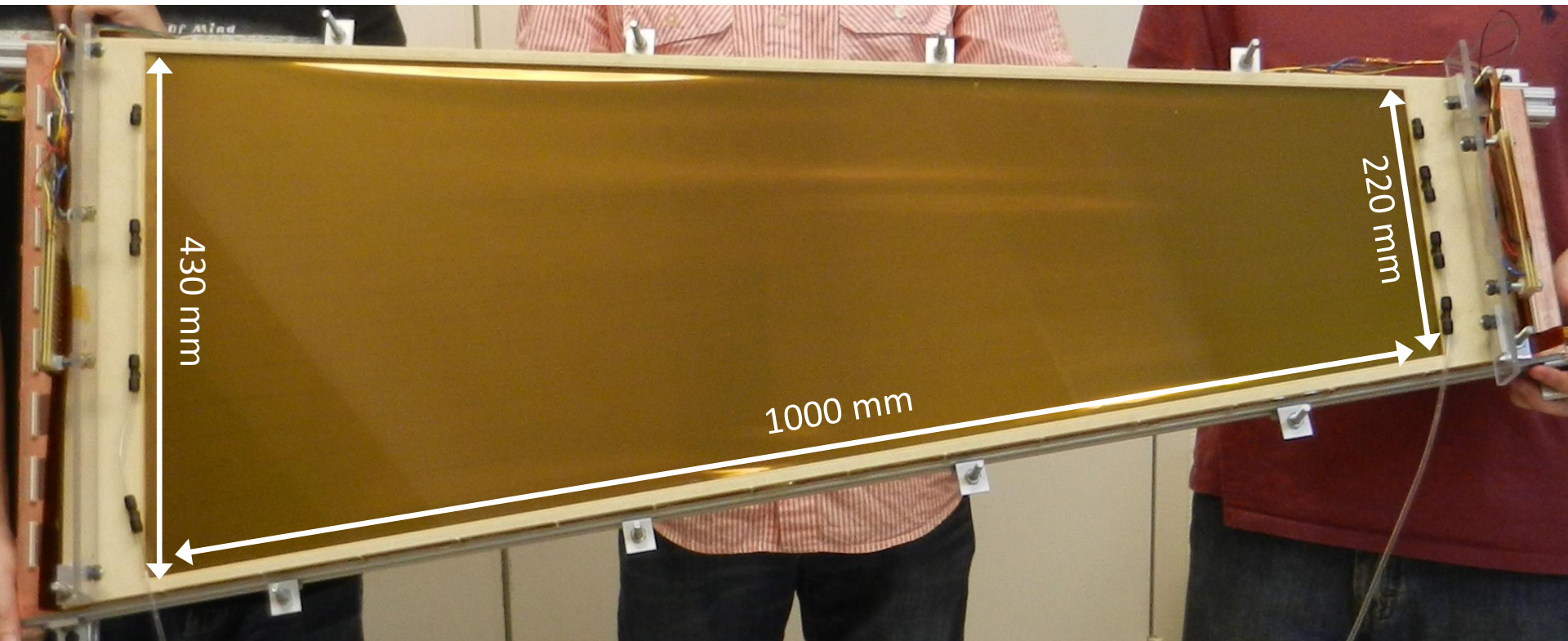
Update on EIC GEM prototype residuals and other issues

Kondo Gnanvo

residuals and resolution studies

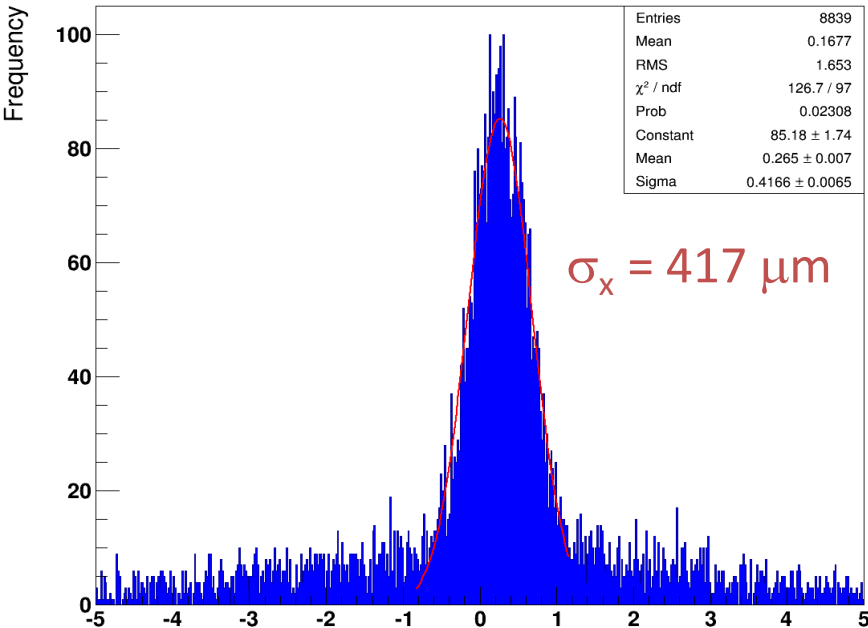
Real dimensions of EIC-SoLID GEM active area

- Original design: Large base = 440 mm, small base = 220 mm and length = 1000 mm
- Actual design (CERN Gerber files): Large base = 430 mm, small base = 220 mm, length = 1000 mm
- Up to now the residual analysis using 440 mm with a u-v angle 12.4° instead of the real angle 12.14°



120 GeV Proton: Residuals of the EIC-SoLID with 440 mm

EIC1XResiduals

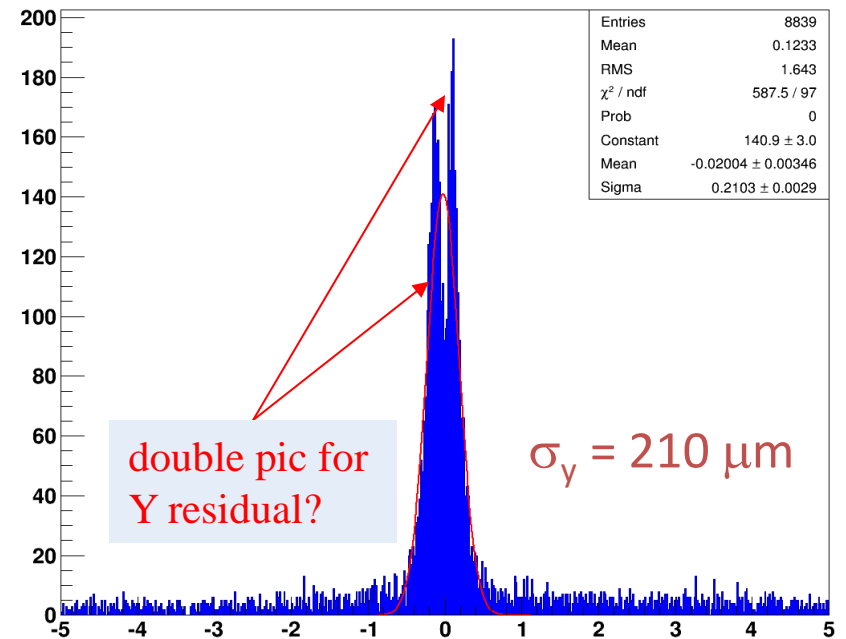


Using the **wrong** dimensions:

Large base: 440 mm

Stereo angle: 12.4°

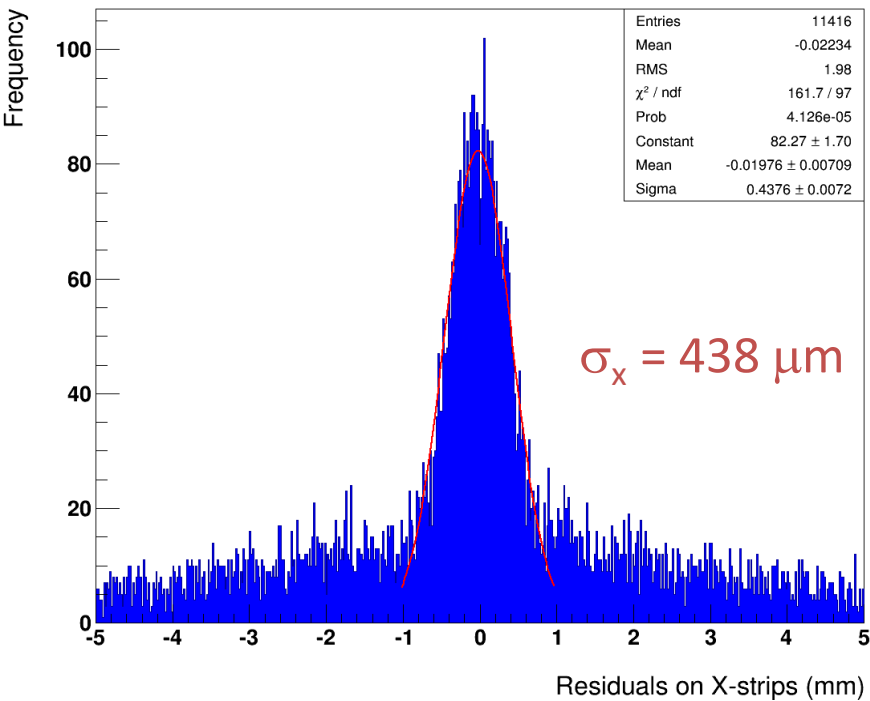
EIC1YResiduals



mm

120 GeV Proton: Residuals of the EIC-SoLID with 430 mm

EIC1X Residuals

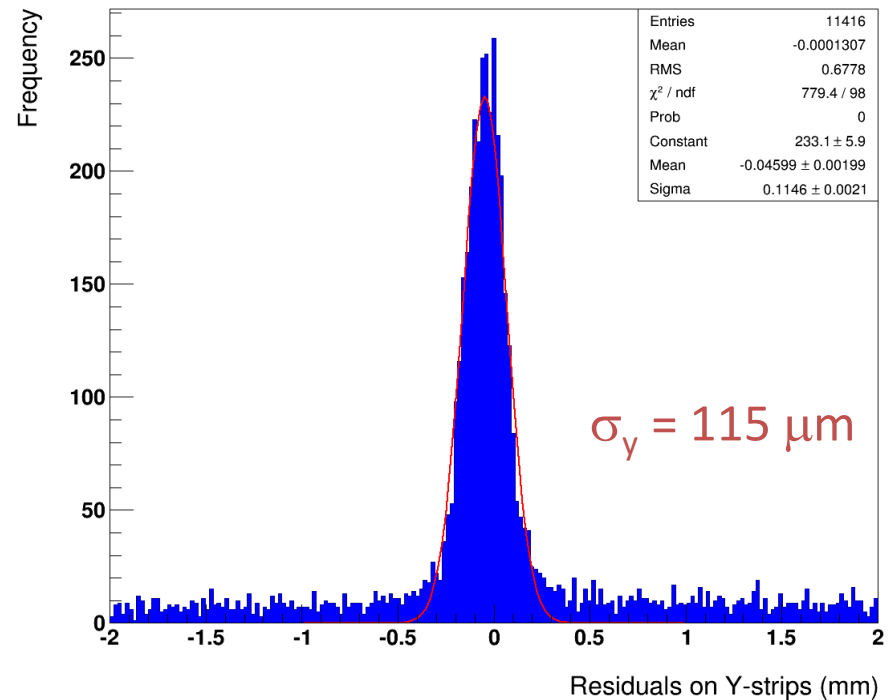


Now with the **correct** dimensions:

Large base: 430 mm, Stereo angle: 12.14°

Double pic in Y residual distribution is gone

EIC1Y Residuals



Residuals of the EIC-SoLID in cylindrical coordinates system (r, ϕ)

Cylindrical coordinates

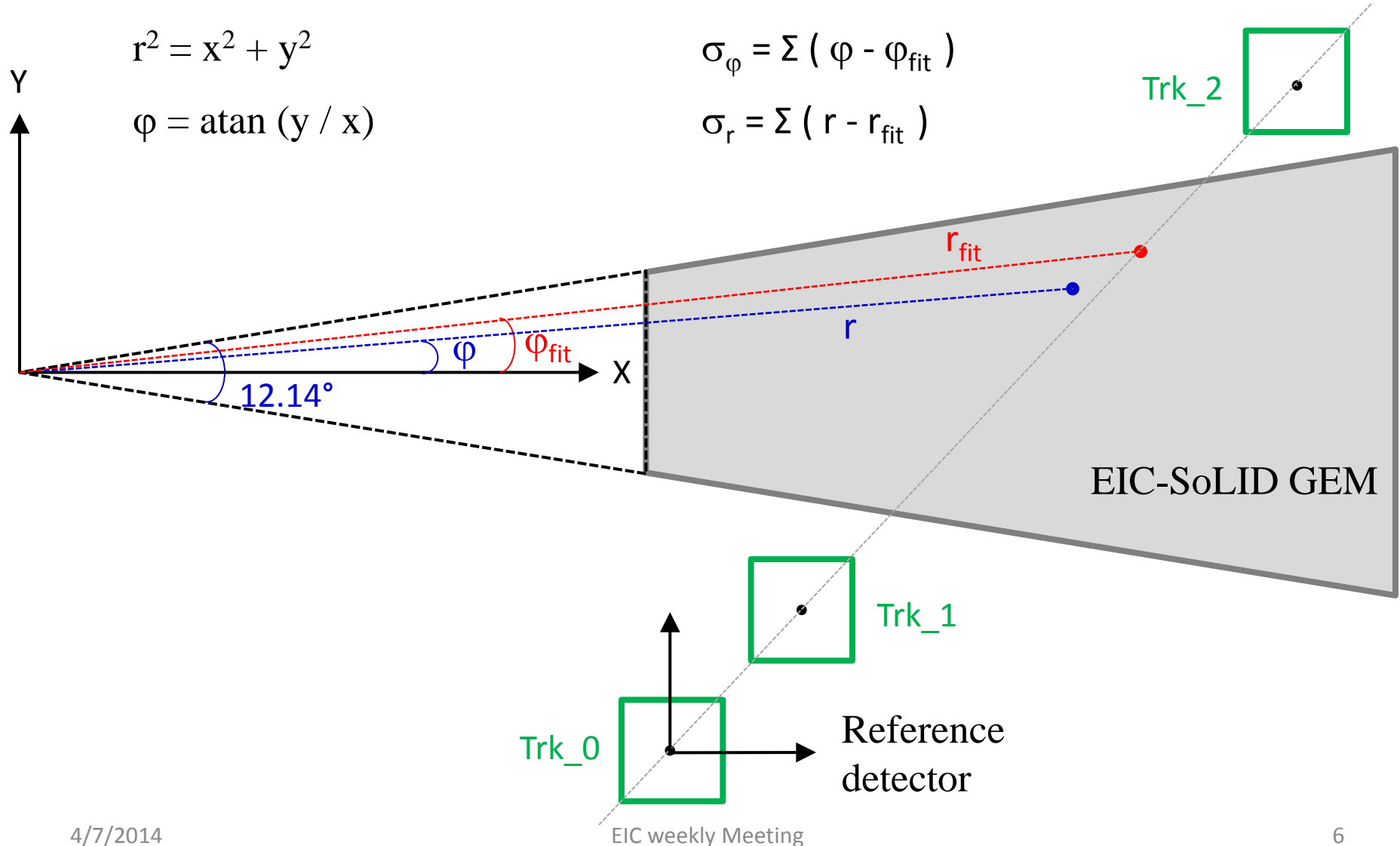
$$r^2 = x^2 + y^2$$

$$\phi = \text{atan} (y / x)$$

Residuals

$$\sigma_{\phi} = \Sigma (\phi - \phi_{\text{fit}})$$

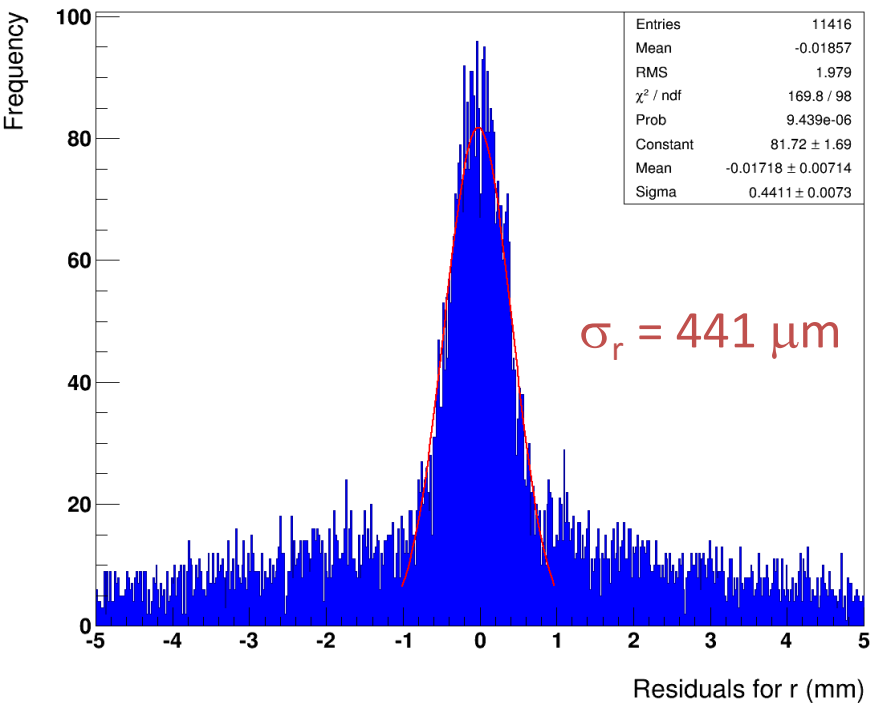
$$\sigma_r = \Sigma (r - r_{\text{fit}})$$



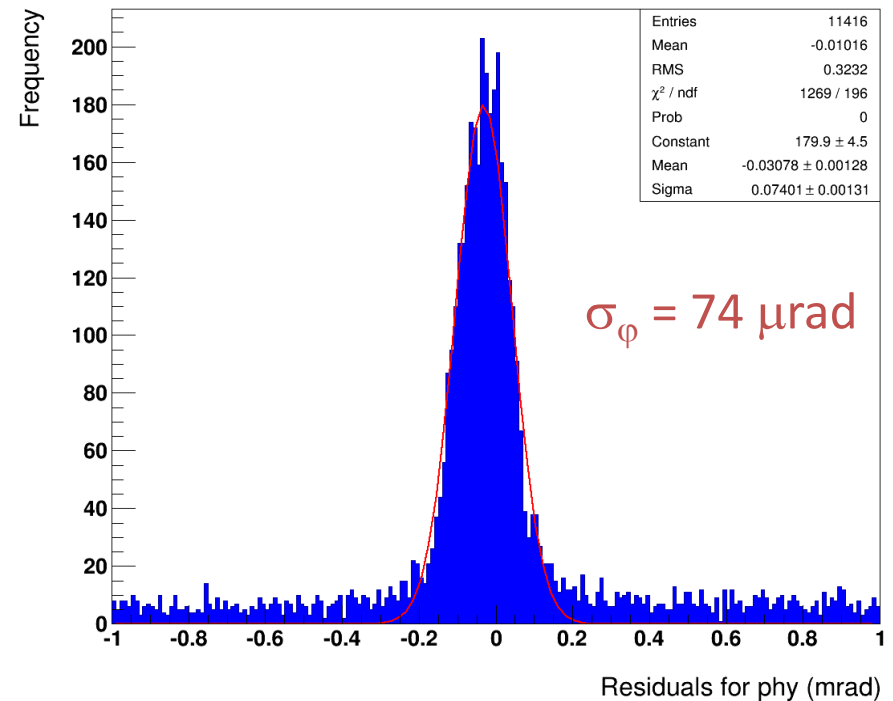
Residuals of the EIC-SoLID in cylindrical coordinates system (r , ϕ)

Exclusive residuals: EIC coordinates excluded from the track fit

EIC1R Residuals

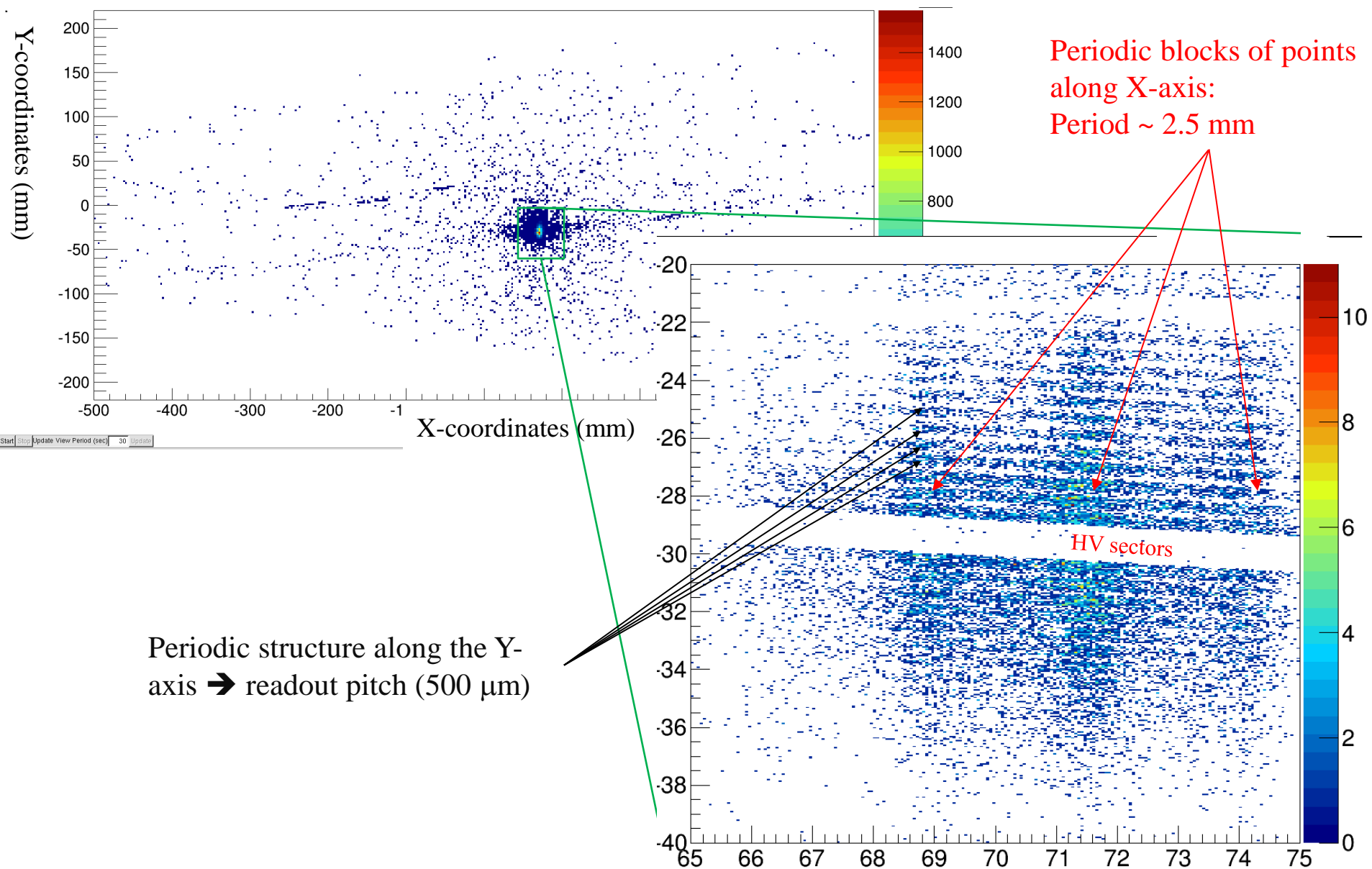


EIC1PHY Residuals



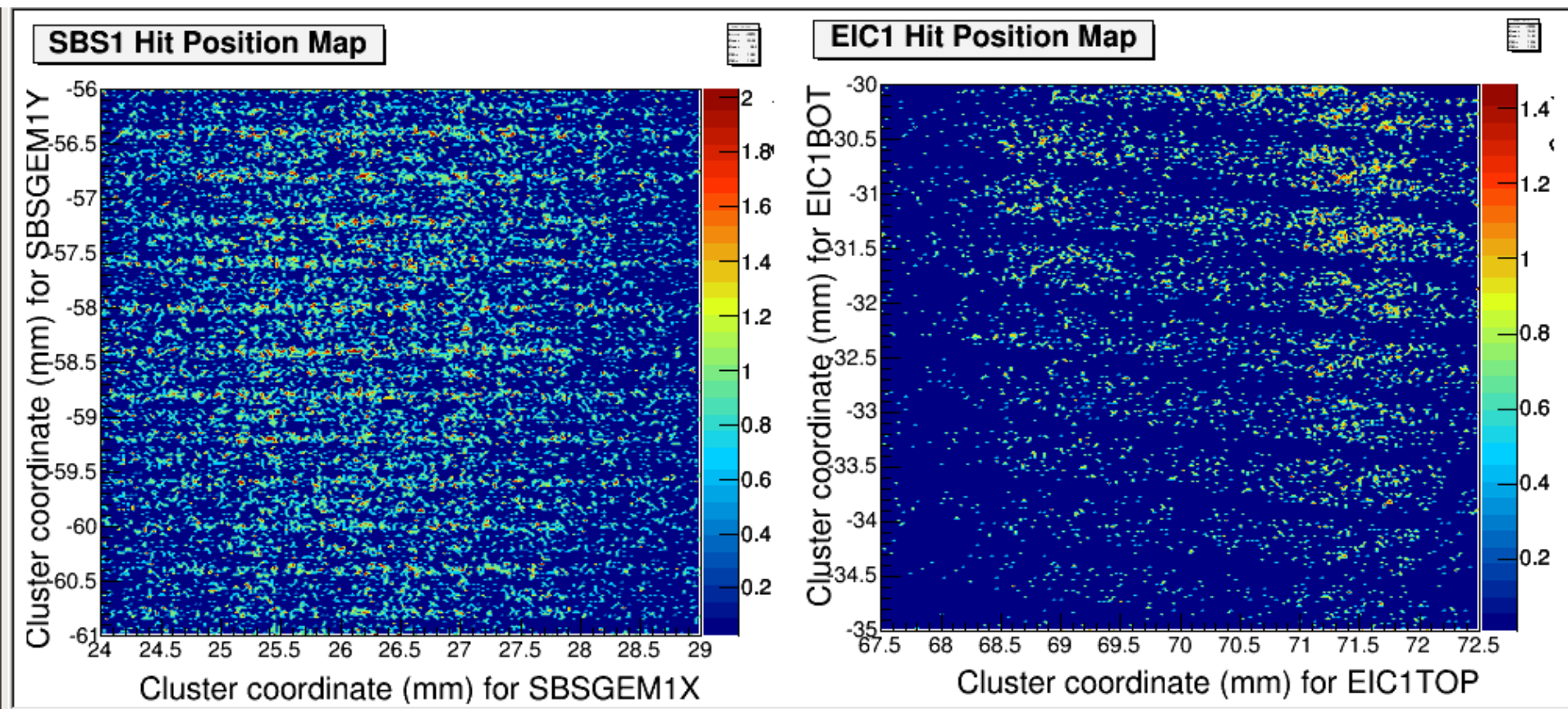
cluster position and COMPASS readout studies

Zoom on beam profile (cluster position distribution) in EIC-SoLID Proto



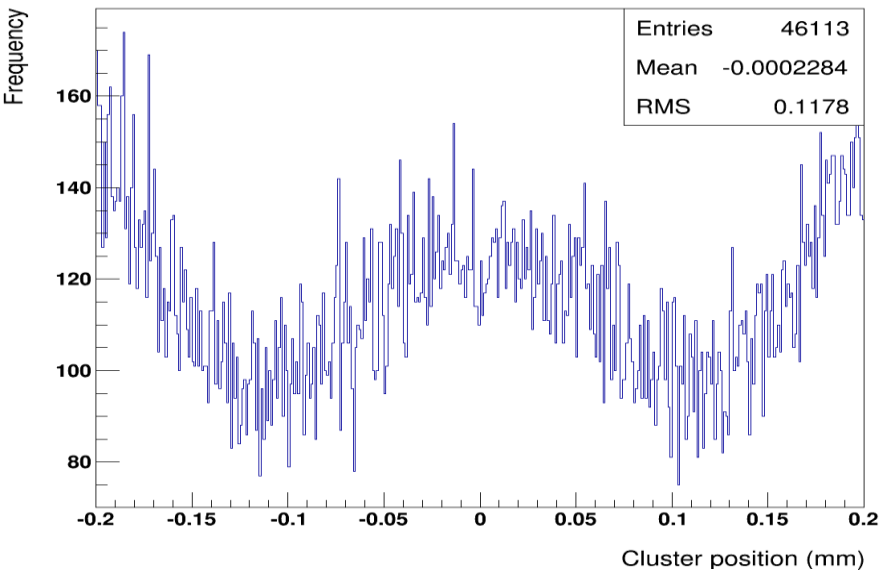
Smaller scale 2D hit map: EIC-SoLID and SBS

- Periodic pattern along the Y axis in both Cartesian and u/v readouts → period = readout pitch

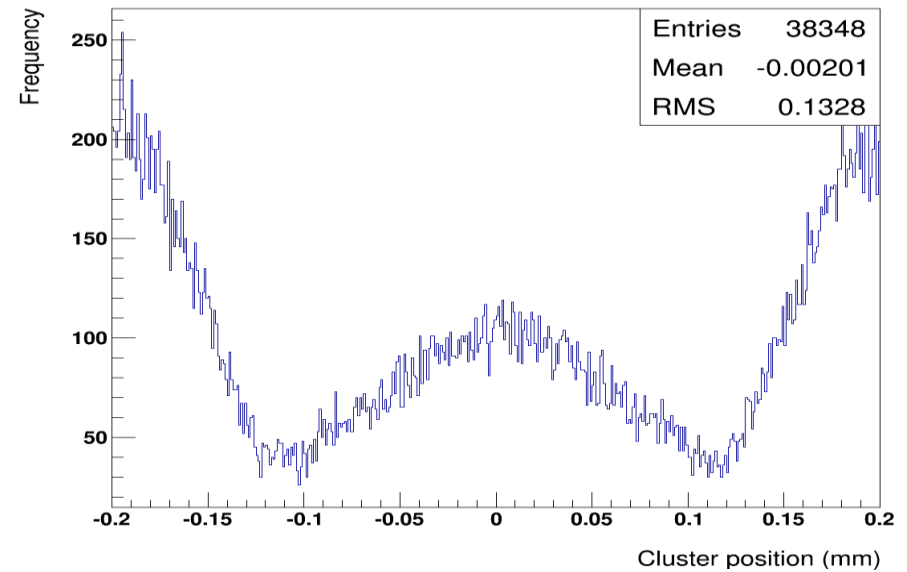


Distance of the cluster position to the nearest strip: (suggested by Dick)

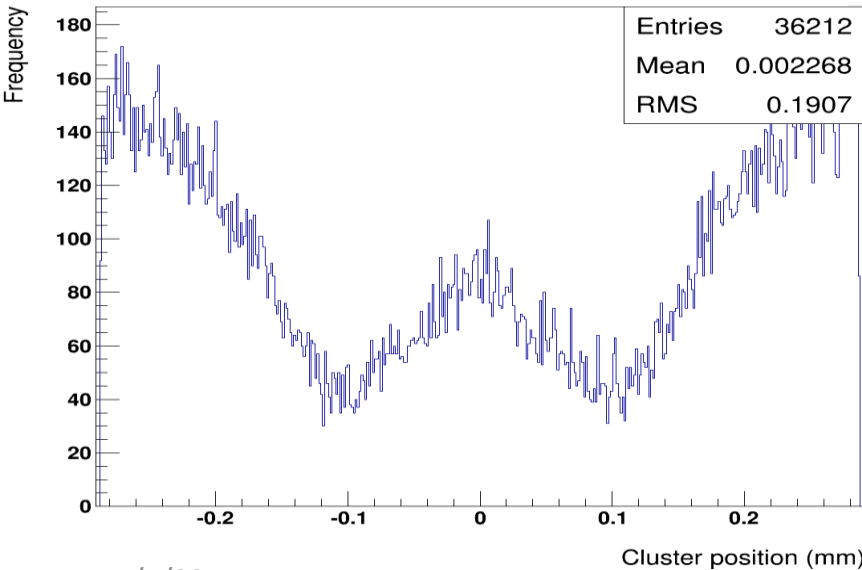
SBS1 top-strips (x-strips)



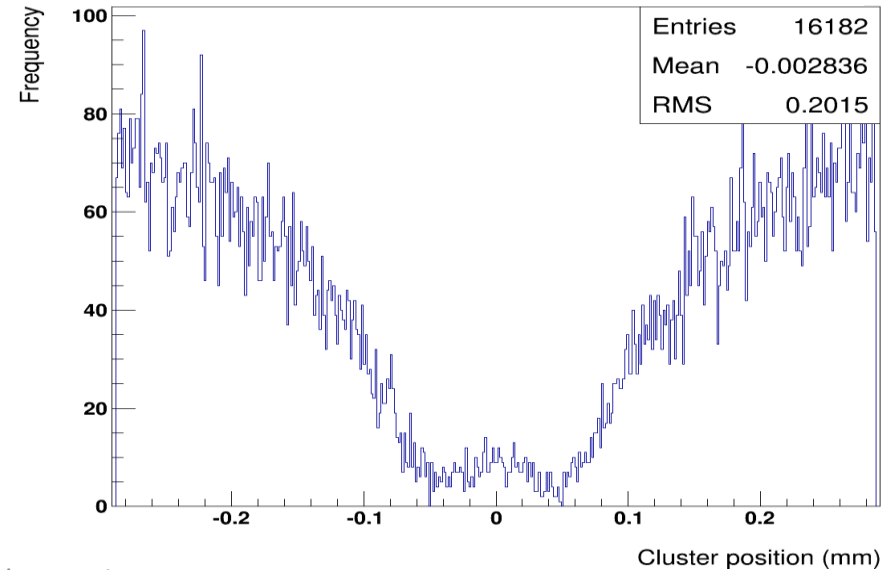
SBS1 bottom-strips (y-strips)



EIC top-strips

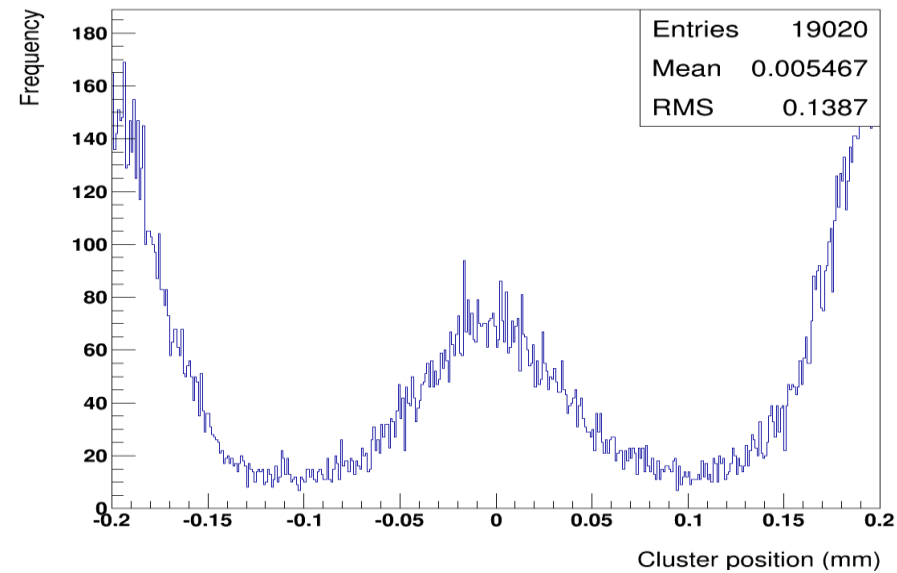


EIC bottom-strips

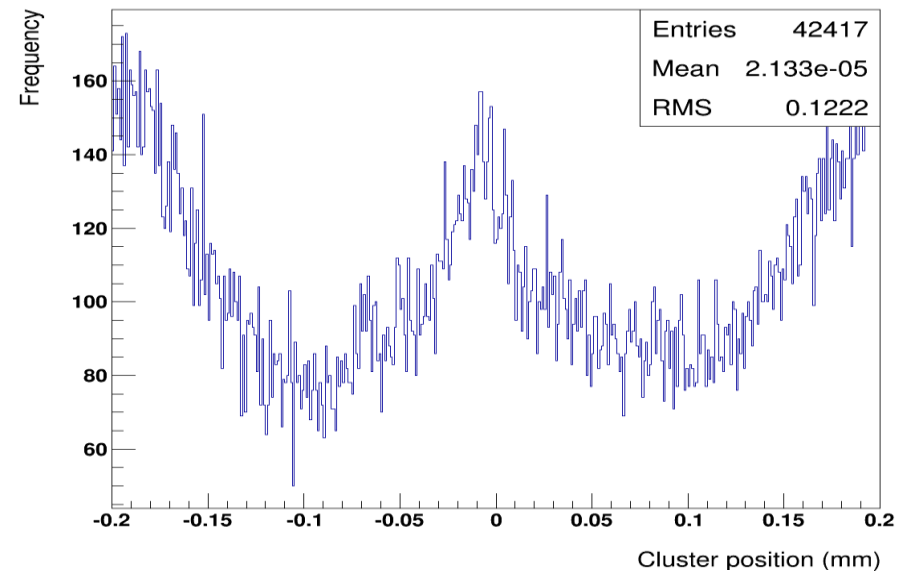


Distance of the cluster position to the nearest strip

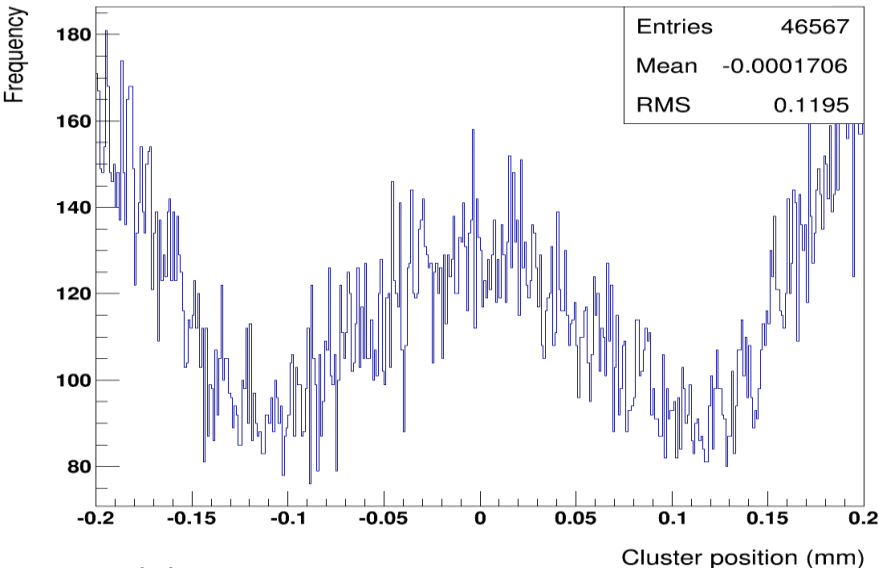
10 × 10 GEM Trk_0 top-strips (x-strips)



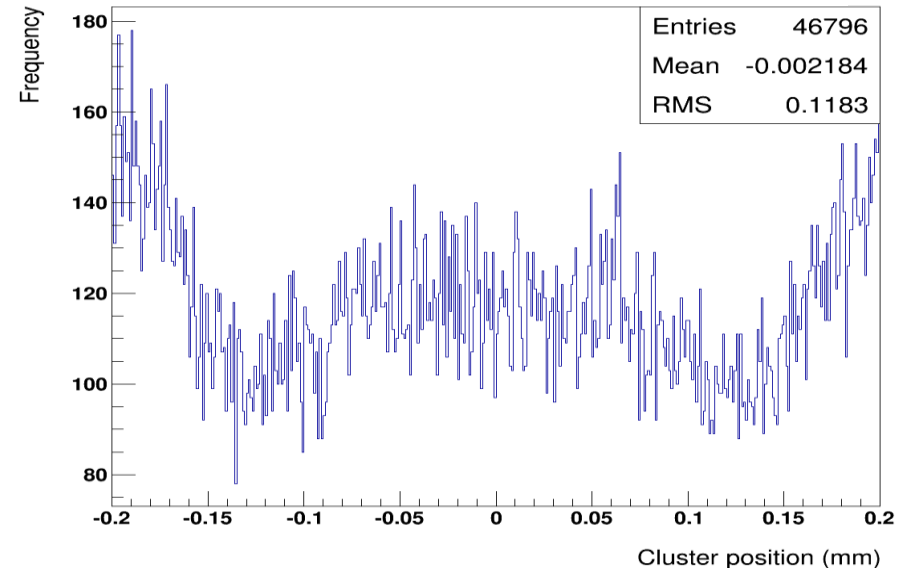
10 × 10 GEM Trk_0 bottom-strips (y-strips)



10 × 10 GEM Trk_1 top-strips (x-strips)

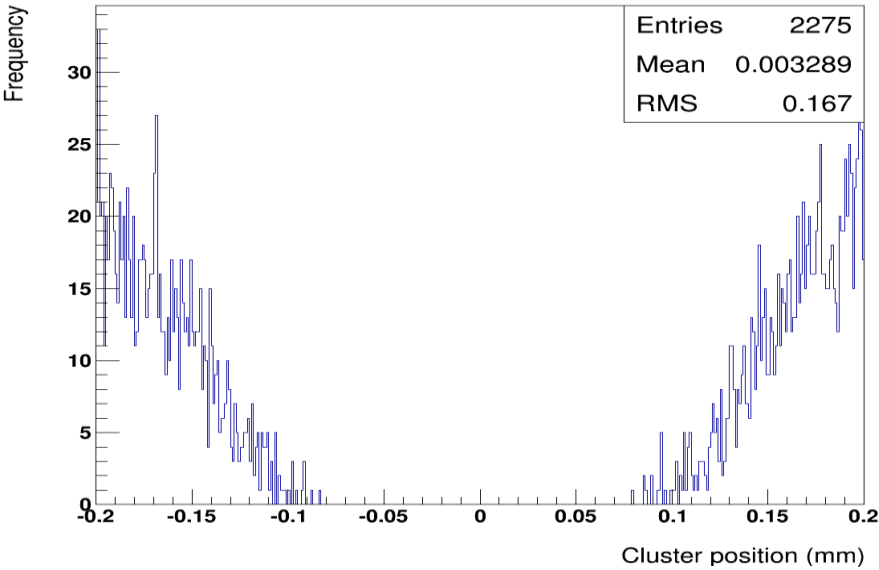


10 × 10 GEM Trk_1 bottom-strips (y-strips)

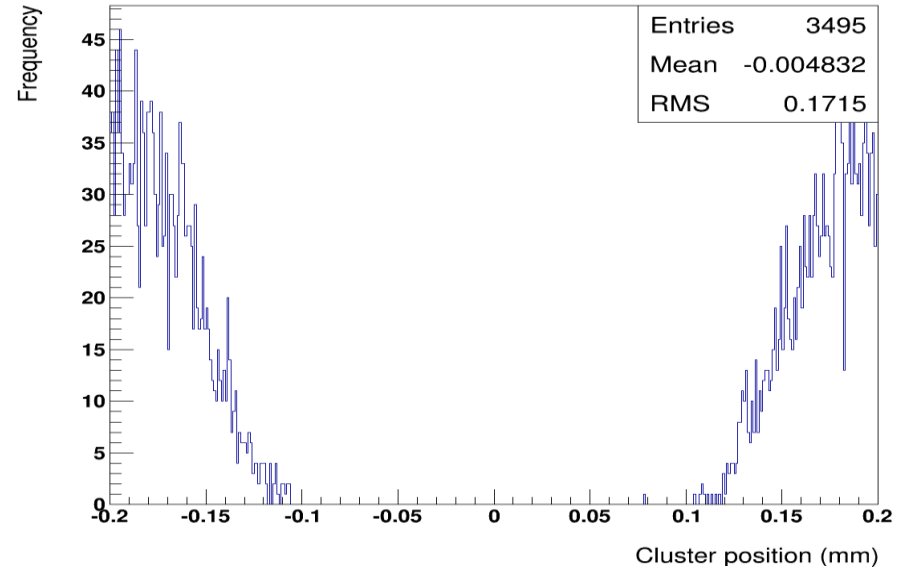


Distance of the cluster position to the nearest strip: Only 2-hit clusters

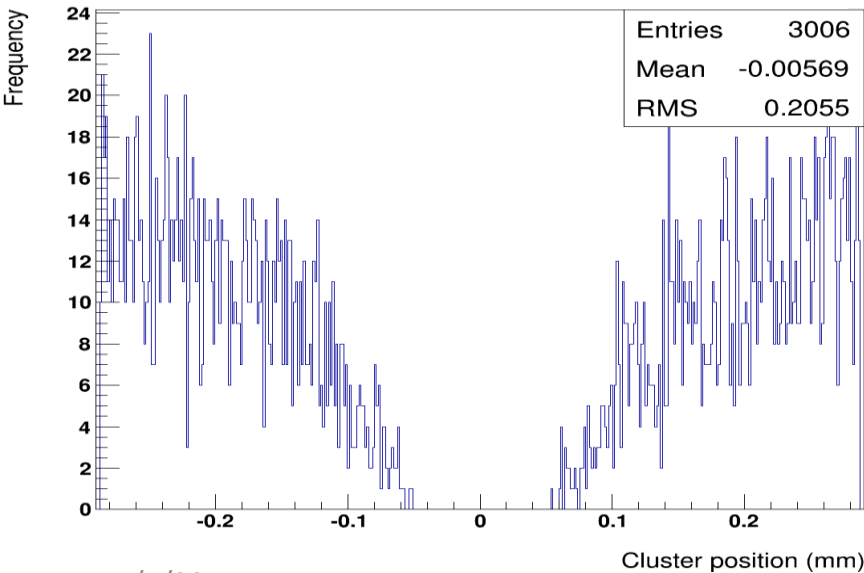
SBS1 top-strips (x-strips)



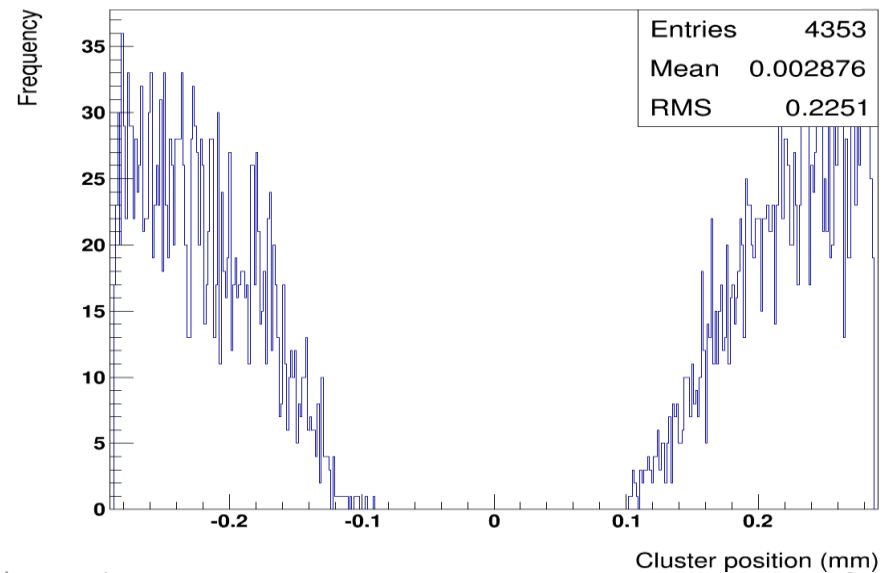
SBS1 bottom-strips (y-strips)



EIC top-strips

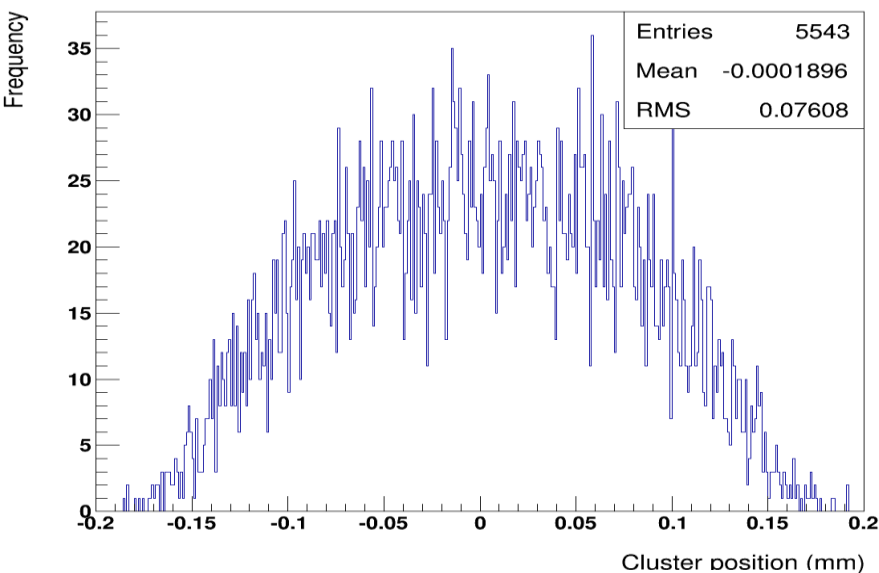


EIC bottom-strips

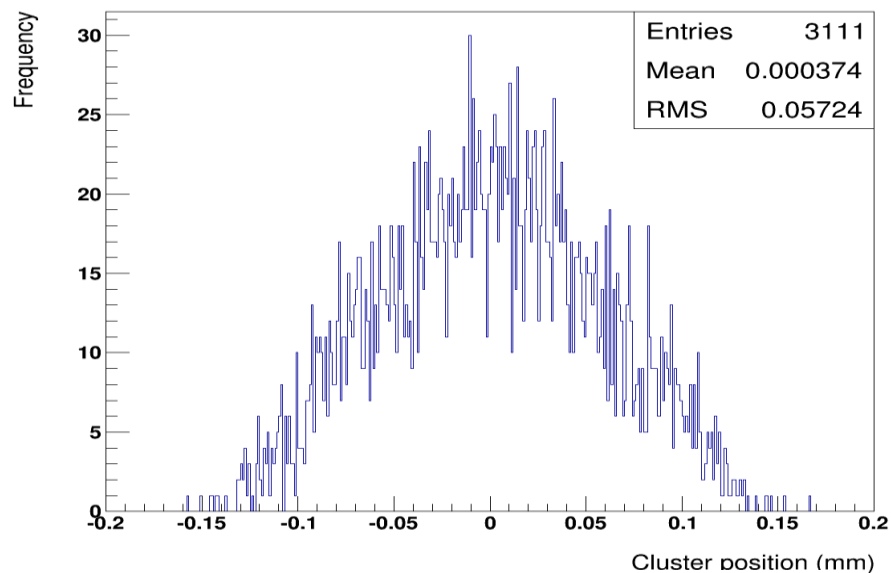


Distance of the cluster position to the nearest strip: Only 3-hit clusters

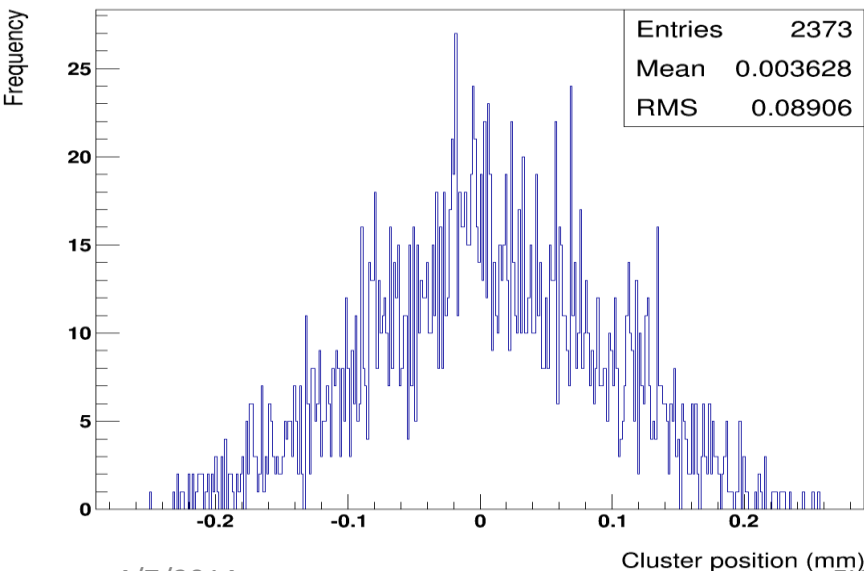
SBS1 top-strips (x-strips)



SBS1 bottom-strips (y-strips)



EIC top-strips



EIC bottom-strips

